Probability class 09 Solved Question paper -2 [2016]

1 Q. If the probability of winning a race of athlete is 1/6 less than the twice probability of loosing game. Find the probability of winning race.

Solution: Let, the probability of losing a race of athlete = x

then, the probability of winning a race of athlete = 2x

Probability of sure event = 1

$\Rightarrow$ x + 2x = 1 $\Rightarrow$ x = $\frac{1}{3}$

Thus, the probability of winning a race of athlete = 2x = $\frac{2}{3}$

2. Q. The length of the 40 leaves of plants given below

Length in mm	118-126	127-135	136-144	145-153	154-162
No. of leaves	12	7	5	14	2

One leaves picked up randomly. find the probability that the leaf picked was of length

(a)more than 126 mm and less than 136 mm (b)more than 126 mm (c)less than 154 mm

Solution: (a) P[more than 126 mm and less than 136 mm] = $\frac{7}{40}$

(b) P[more than 126 mm] = $\frac{7+5+14+2}{40} = \frac{28}{40} = \frac{7}{10}$

(c) P[less than 154 mm] = $\frac{12+7+5+14}{40} = \frac{38}{40} = \frac{19}{20}$

3. Q. A recent survey found that the ages fo workers in a factory is distributed as follows :

Ages	20 - 29	30 - 39	40 - 49	50 - 59	60 and above
No. of Workers	38	27	86	46	3

if a person is selected at randomly, find the probability that a person is

a. 40 yrs or more   b. under 40 yrs   c. having age from 30 to 39 yrs   d. under 60 but over 39

Solution: Total No. of Workers = 38 + 27 + 86 + 46 + 3 = 200

a. the probability that a person is 40 yrs or more = $\frac{86 + 46 + 3}{200} = \frac{135}{200} = \frac{27}{40}$

b. the probability that a person is under 40 yrs = $\frac{38 + 27}{200} = \frac{65}{200} = \frac{13}{40}$

c. the probability that a person is having age from 30 to 39 yrs $= \frac{27}{200}$

d. the probability that a person is having age under 60 but over 39 $= \frac{86 + 46}{200} = \frac{132}{200} = \frac{33}{50}$

4.Q. In a bottle there are 7 red buttons, 5 green buttons and 8 purple buttons. What is the probability that randomly drawn button from the bottle is a purple button ? If one extra green button is put in side the bottle, what will be the probability that randomly drawn button is purple ?

Solution: the probability that randomly drawn button from the bottle is a purple button $= \frac{8}{7+5+8} = \frac{8}{20} = \frac{2}{5}$

One extra green button is put inside the bottle

Then, the probability that randomly drawn button is purple $= \frac{8}{7+6+8} = \frac{8}{21}$

5. Q. A box contains 19 balls bearing numbers 1, 2, 3, ……….. 19. A ball is drawn at random from the box. What is the probability that the number of ball is

(i) a prime member   (ii) divisible by 3 or 5

(iii) neither divisible by 5 nor by 10   (iv) an even number [Delhi 2006]

Solution: Total number of balls = 19

(i) Prime number from 1 to 19 are 2, 3, 5, 7, 11, 13, 17, 19

$\Rightarrow$ Total prime numbers =8

Therefore probability of drawing a prime numbers $= \frac{8}{19}$

(ii) Numbers divisible by 3 or 5 are 3, 6, 9, 15, 18, 10, 5, 12

$\Rightarrow$ Total numbers divisible by 3 or 5 = 8

Therefore probability of drawing a number divisible by 3 or 5 = $\frac{8}{19}$

(iii) Number divisible by 5 and 10 are 5, 10, 15

$\Rightarrow$ Total number divisible by 5 and 10 = 3

Therefore numbers which are neither divisible by 5 nor 10 are = 19 – 3 = 16

Therefore required probability $= \frac{16}{19}$

6. Q. A bag contains white, black and red balls only. A ball is drawn at random from the bag. If the probability of getting a white ball is 3/10 and that of a black ball is 2/5 , then find the probability of getting a red ball. If the bag contains 20 black balls, then find the total number of balls in the bag.

Solution: The probability of getting a white ball is 3/10

The probability of getting a black ball is $\frac{2}{5}$,

Then the probability of getting a red ball = 1 - $\left(\frac{3}{10} + \frac{2}{5}\right)$ = $1 - \frac{7}{10} = \frac{3}{10}$

Let the total ball = x and the bag contains 20 black balls

The probability of getting a black ball is $\frac{2}{5} = \frac{20}{x} \Rightarrow$ the total ball = x = 50

7. Q. A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card drawn is (i) a card of spade or an ace. (ii) a black king. (iii) neither a jack nor a king. (iv) either a king or a queen.

Solution: pack of cards has 52 cards.

It has 13 cards of each suit, namely Spades, Clubs, Hearts and Diamonds.

Cards of spades and clubs are black cards.

Cards of hearts and diamonds are red cards.

There are 4 honors of each suit. Number card: Ace,2,3,4,5,6,7,8,9,10

Face cards : Kings, Queens and Jacks.

(i)The probability that the card drawn is a card of spade or an ace. $= \frac{\text{a card of spade or an ace}}{52}$

$$= \frac{13+3}{52} = \frac{16}{52} = 4/13$$

(ii) The probability that the card drawn is a card is a black king. $= \frac{2}{52} = 1/26$

(iii) The probability that the card drawn is a card that is neither a jack nor a king. $= \frac{52 - (4+4)}{52} = \frac{44}{52} = \frac{11}{13}$

(iv) The probability that the card drawn is a card that is either a king or a queen. $= \frac{4+4}{52} = \frac{8}{52} = \frac{2}{13}$

8. Q. A bag contains 20 balls out of which x balls are red.

(i) If one ball is drawn at random from the bag, find the probability that it is not red.

(ii) If 4 more red balls are put into the bag, the probability of drawing a red ball will be 5/4 times the probability of drawing a red ball in the first case. Find the value of x.

Solution: (i) the probability that it is not red $= \frac{20 - x}{20}$

(ii) the probability of drawing a red ball will be 5/4 times the probability of drawing a red ball in the first case

$\Rightarrow \frac{24 - x}{24} = \frac{5}{4} x \left(\frac{20 - x}{20}\right) \Rightarrow \frac{24 - x}{24} = \left(\frac{20 - x}{16}\right) \Rightarrow 24 - x = 24 x \left(\frac{20 - x}{16}\right)$

$\Rightarrow 4(24 - x) = 120 - 6x \Rightarrow 120 - 96 = 6x - 4x \Rightarrow \frac{24}{2} = x \Rightarrow x = 12$

9. Q. Three coins are tossed. What is the probability of getting at most two tails?

Solution: Total number of outcomes possible when a coin is tossed = 2 ($\because$ Head or Tail)

Hence, total number of outcomes possible when 3 coins are tossed, = 2 × 2 × 2 = 8

(∵ i.e., S = {TTT, TTH, THT, HTT, THH, HTH, HHT, HHH})

the probability of getting at most two tails = P(E) = $\frac{7}{8}$ {TTH, THT, HTT, THH, HTH, HHT, HHH}

10. Q. What is the probability that Two friends have (i) the same birthday (ii) different birthday?

Solution: **(i)** Number of days in a year = 365 Therefore, total possible outcomes = 365
If they have birthday on same day then no. of favorable outcomes =1 Therefore, Required Probability =$\frac{1}{365}$

(ii) The probability that Two friends have different birthday = $1 - \frac{1}{365} = \frac{364}{365}$

11.Q. The king, queen and jack of clubs are removed from a pack of 52 playing cards and then the remaining pack is well shuffled. One card is selected from the remaining cards. Find the probability of getting (i) a heart (ii) a king (iii) a club (iv) a black card

Solution: (i) a heart = 13/49 {Cards remaining in the deck = 52 - 3 = 49}

(ii) a king = $\frac{3}{49}$ (iii) a club = $\frac{10}{49}$ (iv) a black card = $\frac{23}{49}$

12. All kings, queens and aces are removed from a pack of 52 cards. The remaining cards are well shuffled and then a card is drawn from it. Find the probability that the drawn card is

 (i) a black face card.   (ii) a red card.

Solution. Total no. of cards remaining in deck = 52 – 12 = 40
(i) No. of black face cards = 1 Jack of spade + 1 Jack of club = 2

Therefore, Required probability = 2/40 = 1/20

(ii) No. of red cards = 26 – 6 = 20 [Because diamond and heart cards are of red colour]

Therefore, required probability = 2040 = 12